10. IMPROVEMENT PROGRAM

This chapter describes the methodology used in developing the Utility's Capital Improvement Program (CIP), and presents the estimated costs and schedules for implementation using 6-year and 20-year planning horizons.

10.1 DEVELOPMENT

A list of potential projects to address water system needs and deficiencies was made. The projects were developed using information from Operations personnel; projections and analyses as discussed in earlier chapters of this WSP; and the 2010 WSP Amendment prepared for the City of Vader.

A review of the capital projects proposed in the 2008 WSP and 2010 WSP Amendment was made for completion status, and future need. Table 10.1 outlines the status.

TABLE 10.1 – PAST CIP PROJECTS

PROJECT #	DESCRIPTION	STATUS	
		Completed	Modified for 2015 WSP
SO-1	Intake Structure Evaluation		SO-1
ST-1	Reservoir Inspection	2013	
ST-2	Interior Reservoir Cleaning		ST-1
ST-3	Exterior Reservoir Coating		ST-1
ST-4	Additional Storage Reservoir		ST-2
TR-1	SR 506 Transmission Main Replacement	2012	
TR-2	Raw Water to Backwash Improvement	2012	
TR-2	Chartless Recorders	2015	
D-1	9th, B and D St Water Main Replacement	2012	D-6
D-2	A, 5th and B St Water Main Replacement	2012	
D-3	Park Rd, E, 10th and F St Water Main Replacement and Road Crossing	2012	
D-4	C St Alley, 6th and E St Alley Water Main Replacement	2012	
D-5	SR 506/7th St and A St Water Main Replacement Project		D-5
D-6	Leak Detection Survey	2011	
D-7	Bridge Deck Pipe Support Replacement		D-10
D-8	Enchanted Valley Water Main Replacement Project		D-2
D-9	C, 9th and E St Alley Water Main Replacement		D-6
D-10	E St Alley Water Main Replacement	2012	D-7
D-11	Main St and A St Alley Water Main Replacement		D-11
D-12	C St Alley, C and D St Water Main Replacement	2012	
M-1	Meter Replacement Program	2014	

The Utility completed many of the CIP projects in 2012 with the huge infusion of capital funding in 2010. The funds were from a CDBG grant and a DWSRF loan. The remaining CIP projects were evaluated and developed into new CIP projects.

A 20-year planning and implementation period was used. Projects of high priority were scheduled for implementation within the six-year planning horizon (2014-2020); and projects that serve anticipated growth or less critical to system operations were scheduled between the six-year to 20-year period (2020-2034). Projects that address current system needs were considered high priority. Where applicable, the timing of projects has been coordinated with other jurisdictional improvements in the right-of-way.

The CIP is the result of planning based on current information. It is possible that other projects may arise which are not identified in this WSP. These projects may come about for ensuring water quality, responding to hazard and emergency events, complying with new regulatory requirements, accommodating improvements proposed by other agencies or departments, and addressing unforeseen problems. Due to budgetary constraints or funding opportunities, some of the projects outlined in this chapter may be combined, deleted and re-scoped to optimize resources. These situations will affect schedules and budget; therefore, the Utility reserves the flexibility to reschedule and reevaluate utility CIP projects. Design and construction of CIP projects will follow the procedures summarized in Chapter 9.

Planning level cost estimates were developed for each project. Each project cost includes the following components:

- **Base Construction Cost** includes all labor, equipment and materials based upon unit construction costs from bid tabulations for recent and similar projects. The work, measure of payment and payment are based on WSDOT Standard Specifications.

- **Sales Tax** is calculated at 8% of the Base Construction Cost.

- **Construction Contingency** considers the uncertainties associated with estimates derived at the planning level; and it is calculated at 30% of the sum of the Base Construction Cost and Sales Tax.

- **Engineering** includes administration, permitting, design and all costs to prepare plans and specifications for bid; and construction management which includes inspection, administration, engineering, material review, testing, as-built drawings and all costs to ensure construction is complete from contract award to completion. For most projects, it is calculated at 25% of the Base Construction Cost.

A summary of the projects and cost estimates is provided in Table 10.2. The locations of CIP projects are shown in Figure 10.1. Detailed cost estimates are provided in Appendix K.

TABLE 10.2 – CIP PROGRAM				
PROJECT #	DESCRIPTION	PRIORITY	TOTAL ($)	CIP YEAR
ST-2	Additional Reservoir	6-YR	$717,000	2017
D-1	SR 506 West of Olequa Creek Water Main Replacement	6-YR	$107,900	2020
TR-1	Turbidimeters	6-YR	$3,000	2017
TR-3*	Comprehensive Electrical Survey	6-YR	$10,000	
TR-4	On-line Analyzer	6-YR	$6,500	2016
TR-5	SCADA System Improvements	6-YR	$20,000	2018
D-11	Pressure Reducing Valve Stations	6-YR	$18,900	2021
	6-YEAR CIP TOTAL		**$883,300**	
PRV-1	PRV Downstream of Node 116	20-YR	$2,459	
PRV - 2	PRV Upstream of Node 107	20-YR	$2,459	
TR-6	Leak Detection	20-YR	$4,000	
TR-7	Energy Audits	20-YR	$4,000	
ST-1	Reservoir Life Extension	20-YR	$266,800	
D-2	Firgrove Road, Enchanted Valley Drive South & Horseshoe Bend Water Main Replacements	20-YR	$107,900	
D-3	Enchanted Valley Water Main Replacements	20-YR	$737,900	
D-4	8TH Street Water Main Replacement	20-YR	$231,900	
D-5	7th Street Water Main Replacement	20-YR	$520,300	
D-6	9th and C Streets Water Main Replacements	20-YR	$153,000	
D-7	Annonen Road Water Main Replacement	20-YR	$87,200	
D-8	D and E Streets Water Main Loop	20-YR	$127,300	
D-9	Customer Shutoff Valves	20-YR	$154,200	
D-10	SR 506 Bridge Deck Pipe Support Replacement	6-YR	$11,000	
	20-YEAR CIP TOTAL		**$2,410,418**	

10.2 CAPITAL IMPROVEMENTS

The CIP reflects replacement and growth-related projects. Replacement and renewal projects deal with the replacement of existing and depreciated facilities. Growth related projects deal with system expansion and new customers.

ST-1 Reservoir Life Extension

The life of the existing 250,000-gallon welded steel tank can be extended with proper retrofitting and maintenance. The existing reservoir has not been recoated since it was constructed in 1979. The reservoir and clearwell were inspected by professional divers in July 2013. The inspection showed several areas in poor condition which could be recoated.

Welded steel tanks are inherently more resistant to seismic damage than bolted steel tanks so there is some value in recoating, retrofitting and improving the existing tank to extend its useful life. With proper care, the useful life of a welded tank is between 75 and 100 years.

This project would also include analysis and design of improvements to strengthen the structural integrity of the reservoir and to improve operational efficiencies.

ST-2 Additional Reservoir

An additional reservoir would replace the existing reservoir with one that meets current seismic code requirements, provide storage capacity for plant shutdowns and maintenance, improve system pressure for customers served in the immediate downstream vicinity of the plant and support a countywide network of safe potable water during declared disasters and emergencies. Lewis County received a CDBG Grant of $717,000 to add an additional reservoir, and has contracted with MSA to perform the design and construction engineering. This reservoir should be constructed in the summer of 2017.

D-1 SR 506 West of Olequa Creek Water Main Replacement

The 6" main on SR506 west of Olequa Creek had several leak repairs made in the last three years. The main is alongside SR 506 which is heavily used by logging trucks and large loaded vehicles. Several leaks have been found in the segment of the main crossing SR506 which could be prevented and easily repaired if a crossing conduit was used. Other irregularities noted in the repairs were absence of bedding material and improper connections. This project will also construct a segment of the existing main to make it more effective for service and to simplify operations.

D-2 Firgrove Road, Enchanted Valley Drive South and Horseshoe Bend Water Main Replacements

This project will improve system and fire pressures to the Enchanted Valley Drive area. The project will construct a 6" main to replace the existing 4" main on Firgrove Road to Enchantment Lane, 6" main to replace the existing 2" main on Enchanted Valley Drive South and 4" main to replace the existing 2" main on Horseshoe Bend. Multiple repairs on Horseshoe Bend found irregularities in the bedding material, pipe material, pipe connections, bedding materials and meter boxes.

D-3 Enchanted Valley Water Main Replacements

Water main replacement in this project area will vastly improve system and fire pressures to the Enchanted Valley water system. This area was developed in the mid-1960s and initially served by five wells and a pump station. The distribution lines were sized originating from the pump house but the wells were abandoned when the development purchased water from the City. However, some of the distribution mains were not improved to handle distribution from the water treatment plant.

The project will construct a 8" main from the plant to Little Pinto Court, Enchanted Valley Drive South and Enchanted Valley Drive North; 6" main on Spring Court, Olequa Place and Olequa Drive. The latter segment on Olequa Drive would be from about Park Place to Olequa Court. Information about the mains in this area are sketchy. Repairs made in this area found irregularities in the bedding material, trench separation of multiple utilities, service line

connections and meter box installations. This project will also include blowoff assemblies, hydrant assemblies and a sampling station. The sampling station would enable access to a downstream section of the prior Enchanted Valley Country Club system.

D-4 8th Street Water Main Replacement

This project will improve system pressure, efficiency and operations by constructing a new main on 8th Street from E Street to I Street; and connecting mains on E, F and G Streets from 8th to 9th Street. This project will loop three dead end mains.

D-5 7th Street Water Main Replacement

This project will replace about 4800 lf of existing AC mains along 7th Street, "A" Alley from 6th to 7th Streets, A Street from 7th to 8th Streets, and C Street from 8th to 7th Streets. This project is considered a "Developer Paid" project as it will primarily benefit undeveloped properties along and adjacent to 7th Street (also known as SR 506).

D-6 9th Street and C Street Water Main Replacements

This project will replace AC mains along 9th Street from B Street to E Alley, and on C Street from 8th to 9th Streets. Another element of this project is to improve an existing 2" service main on E Alley south of 9th Street to eliminate a dead end line. This project will remove about 1,250 lf of AC water main in the water system. The completion of projects D-5 and D-6 will completely remove all AC mains in the water system.

D-7 Annonen Road Water Main Replacement

The existing 2" main along Annonen Road will be replaced with a 4" main.

D-8 D and E Streets Loop

The existing 2" water service mains south of 6th Street on D Street, E Street Alley and E Street will be eliminated. The three dead end lines will be replaced with a new 8" water main that will extend northerly of 6th Street on E Street, westerly along 5th Street, and southerly on D Street to the existing 10" main at the intersection of 6th and D Streets. This new alignment will create some efficiencies and operational safety by moving some service meters from an alleyway, ridding deadend lines, and reducing main and service line lengths.

D-9 Customer Shutoff Valves

Customer shutoff valves behind the service meter boxes will provide another level of protection from potential cross connection. These valves will enable customers to isolate their premises from the water system.

D-10 SR 506 Bridge Deck Pipe Support Replacement

WSDOT informed the City in February 2007 that the utility hangers under the SR 506 Olequa Creek bridge were not adequate. However, WSDOT amended their determination after an inspection. WSDOT notified the City in 2007 that they will continue to monitor the integrity of the supports every two years. The estimate of the repair is based on work to be performed by WSDOT maintenance.

D-11 Pressure Reducing Valves

Two pressure reducing valve assemblies were installed and abandoned in the EVCC system. Construction of two pressure reducing valve assemblies will maintain constant pressure in the EVCC distribution mains, reduce likelihood of main breaks and prevent non-revenue water loss.

Treatment Efficiency Improvements

These projects entail development of strategies and implementation of improvements that aim to reduce operating costs to produce and distribute potable water to our customers. The improvements include detailed leak surveys, energy audits, studies, new construction, adaption of processes and procedures, retrofits, and upgrades (mechanical and programming) that will improve operational, technical, managerial and financial capabilities.

TR-1 Turbidimeters

The treatment process relies on turbidity readings from the turbidimeters. The existing turbidimeters were salvaged from the old plant when it was replaced with a mixed media filtration system in 2002. Parts are expensive and hard to find because this model is discontinued. DOH has put us in contact with a utility that is installing a multi-media treatment system and replacing their turbidimeters with laser reading technology. Installation of the new, used turbidimeters was completed in 2014.

TR-2 Chartless Recorders

The chart recorders for turbidities, chlorine residual, pH, raw water influent and finished water effluent are recorded on circular 24-hour charts. We believe these chart recorders pre-date the construction of the water plant in 2002 and were salvaged from the old plant. In any case, these chart recorder models are discontinued. Replacement to chartless recorders will enable instantaneous legible readings; longer storage of data; elimination of pens, paper and paper jams; PC data access; and Ethernet for remote access. – This improvement was accomplished in 2015

TR-3 Comprehensive Electrical Survey

There have been several repairs of plant and intake components since 2011. Many of these problems were associated with worn or faulty electrical relays and switches. These problems took a lot of resources to troubleshoot and correct. A comprehensive electrical survey of the system will help to proactively plan a replacement and improvement schedule, and improve documentation of the control system. *Due to the complexity of adding reservoir capacity to the system, this improvement will be completed as a part of the Additional Water Reservoir

TR-4 On-line Analyzer

The on-line analyzer continuously monitors temperature, pH and chlorine residual of the finished water. This unit is about 15 years old and should be replaced with one that has the capability to send an alarm for low chlorine residuals. Chlorine residual is monitored to ensure the correct *Giardia* inactivation level in the distribution system.

TR-5 SCADA System Improvements

Specific components of the SCADA system installed in 2002 are analog based. Some improvements are needed to convert to digital technology. A new human-machine interface would enable rapid awareness of alarm situations, quick and safe application changes, remote access, improve security, and reduce cost of operations. Cost reductions could be realized in operating supplies, telephone land line service, and personnel overtime.

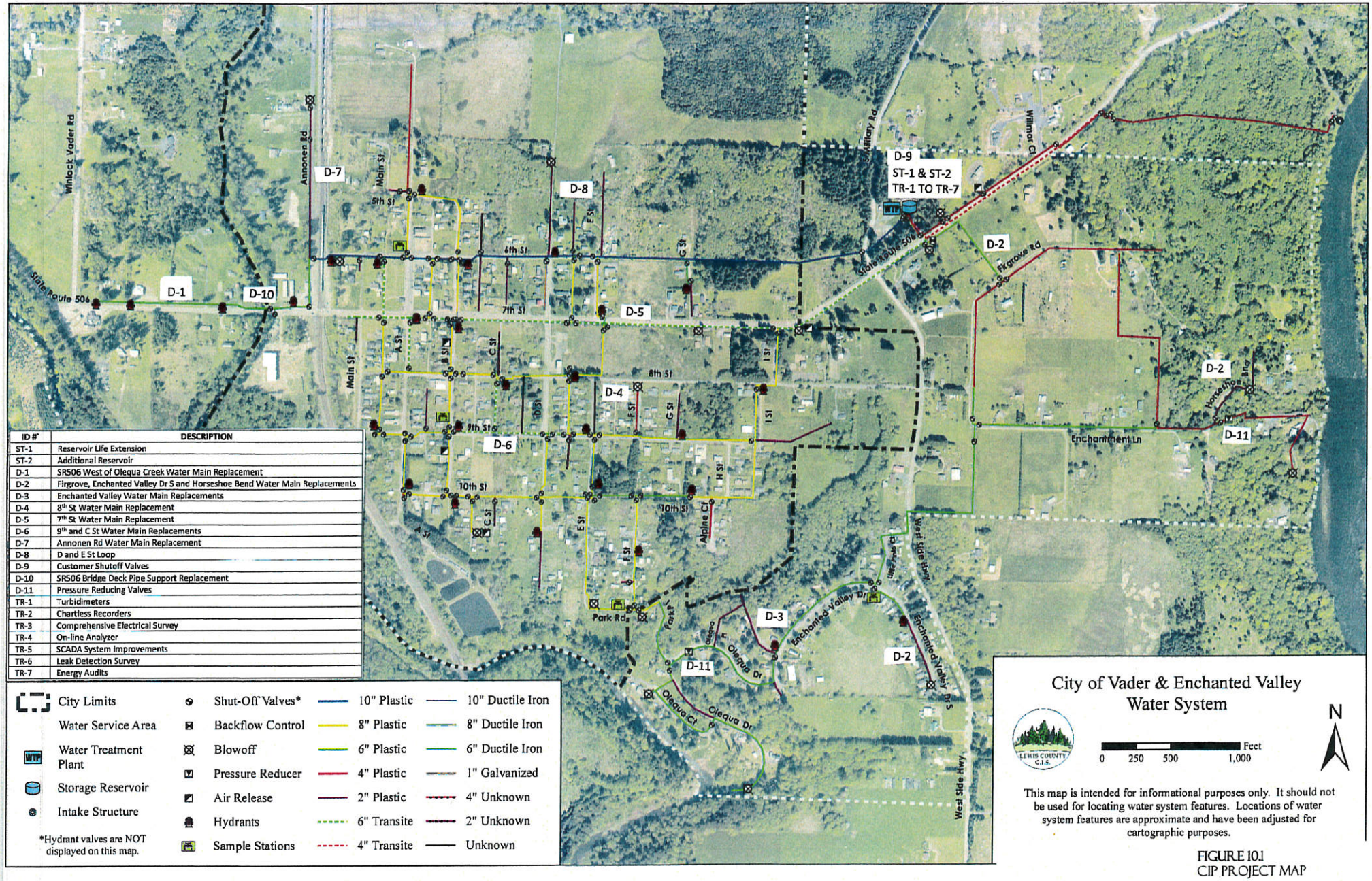
TR-6 Leak Detection Survey

We will continue to implement measures outlined in Chapter 5 to reduce water loss volumes. A leak detection survey was conducted in August 2011 using sonic tests at contact points

throughout the system. In the event, loss volumes are not significantly reduced within five years of this WSP, another leak detection survey may be in order.

TR-7 Energy Audits

Energy efficient lighting was installed in the plant when we began management of the system in 2011. Some other areas of potential savings could be the motor and pumping systems in the intake building and heaters in the plant. An energy audit would identify, assess and plan measures and programs to improve efficiencies.



ID #*	DESCRIPTION
ST-1	Reservoir Life Extension
ST-2	Additional Reservoir
D-1	SR506 West of Olequa Creek Water Main Replacement
D-2	Figrove, Enchanted Valley Dr S and Horseshoe Bend Water Main Replacements
D-3	Enchanted Valley Water Main Replacements
D-4	8th St Water Main Replacement
D-5	7th St Water Main Replacement
D-6	9th and C St Water Main Replacements
D-7	Annonen Rd Water Main Replacement
D-8	D and E St Loop
D-9	Customer Shutoff Valves
D-10	SR506 Bridge Deck Pipe Support Replacement
D-11	Pressure Reducing Valves
TR-1	Turbidimeters
TR-2	Chartless Recorders
TR-3	Comprehensive Electrical Survey
TR-4	On-line Analyzer
TR-5	SCADA System Improvements
TR-6	Leak Detection Survey
TR-7	Energy Audits

City of Vader & Enchanted Valley Water System

N

0 250 500 1,000 Feet

This map is intended for informational purposes only. It should not be used for locating water system features. Locations of water system features are approximate and have been adjusted for cartographic purposes.

FIGURE 10.1
CIP PROJECT MAP